

## REMARKS

In the Office Action mailed January 5, 2007 the Examiner noted that claims 1-14 were pending, that claims 1, 10-12 and 14 have been withdrawn from consideration, and rejected claims 2-9 and 13. Claims 2, 7-9 and 13 have been amended, and claim 15 has been added. Withdrawn claim 14 has been cancelled without prejudice. No new matter has been added. Claims 2-9, 13 and 15 are pending and under consideration.

## DRAWINGS

In response to the objection to the drawings, the legend --Prior Art-- has been included in FIGs 1-5. Approval of the replacement sheets and withdrawal of the objection are respectfully requested.

## CLAIM REJECTIONS UNDER 35 U.S.C. §103

Claims 2, 5-9, and 13, are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication 2003/0081307 by Fludger, in view of U.S. Patent 6,456,426 to Bolshtyansky.

Independent claims 2 and 13 have been amended herewith to recite that "the pump light of the first- and second-order Raman pumps [are modulated] by using a timing offset between the pump light of the first-order pumps and the light pumped of the at least one second-order pump." The amendments are fully supported by the originally filed specification and claims, for example, page 10, lines 17-20. Claims 7-9 have been amended to use the same language as amended claim 2.

Fludger is directed to a Raman optical amplifier with a plurality of pump sources. The outputs from at least two pump sources are modulated so as to reduce the interaction between the pump source signals in the fiber. Although Fludger mentions in paragraph [0026] the possibility that one pump source to be a first order Raman pump and another pump source to be a second-order Raman pump, Fludger does not teach or suggest a system having "a plurality of first-order Raman pumps and at least one second-order Raman pump" as recited in claim 2. Further, Fludger fails to disclose that "a modulator unit [modulates] the pump light of the first- and second-order pumps by using a time offset between the pump light of the first-order pumps and the pump light of the at least one second-order pump" as recited in claim 2.

Bolshtyansky discloses Raman optical amplifiers in which the Raman pump light is

modulated to reduce pump interactions in the fiber by directly modulating the laser diodes or by using optical components that modulate constant power pump light from the laser diodes. Bolshtyansky does not correct or compensate for Fludger's failure to disclose a system having "a plurality of first-order Raman pumps and at least one second-order Raman pump" with "a modulator unit [which modulates] the pump light of the first- and second-order pumps by using a time offset between the pump light of the first-order pumps and the pump light of the at least one second-order pump" as recited in claim 2.

It is submitted that the claims satisfy the requirements of 35 U.S.C. 103(a). It is also submitted that claim 2, and claims 3-9 depending from claim 2 are allowable over the cited prior art.

Claim 13 is directed to an "amplification method employing Raman amplification with a plurality of first-order Raman pumps and at least one second-order Raman pump which amplifies the first-order Raman pumps, the first- and second-order Raman pumps counter-propagating to signal light in an optical fiber." Fludger and Bolshtyansky, alone or in combination, fail to teach or suggest at least "modulating the pump light of the first- and second-order Raman pumps by using a timing offset between the pump light of the first-order pumps and the light pumped of the at least one second-order pump to allow flattening lateral signal power distribution along the optical fiber" as recited in claim 13. Therefore, Applicants respectfully submit that claim 13 patentably distinguishes over the cited prior art.

#### **NEW CLAIM 15**

New claim 15 is directed to Raman amplification method in an optical fiber. Claim 15 is fully supported by the originally filed specification and claims, for example, FIGS. 7-9 and the associated description in the specification. Claim 15 patentably distinguishes over the prior art by reciting "emitting pump light of a plurality of first-order Raman pumps and at least one second-order Raman pump located at an end of the optical fiber, in a direction opposite to a signal light, and having a time offset between the pump light of the first-order Raman pumps and the pump light of the at least one second-order Raman pump, the pump light of the at least one second-order Raman pump interacting with the pump light of the first-order Raman pumps after propagating a predetermined distance from the end of the optical fiber."

#### **CONCLUSION**

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If any further fees, other than and except for the issue fee, are necessary with respect to this paper, the U.S.P.T.O. is requested to obtain the same from deposit account number 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

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By: L Todor  
Luminita A. Todor  
Registration No. 57,639

1201 New York Avenue, NW, 7th Floor  
Washington, D.C. 20005  
Telephone: (202) 434-1500  
Facsimile: (202) 434-1501